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JSA

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YAMASHITA ET AL.

Application No.: 09/147,094

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Group Art Unit: 2779

Examiner: Sajous, W.

For: PROGRAM-GUIDE-DISPLAY CONTROLLING APPARATUS AND TELEVISION RECEIVER

VERIFICATION OF A TRANSLATION

Assistant Commissioner for Patents
Washington, DC 20231

Sir:

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That I am knowledgeable in the English language and in the Japanese language and believe the attached English translation to be a true and complete translation of the certified copy of Japanese application number Hei. 8-152228, filed on June 13, 1996.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and

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[Title of the Invention] **Group 2700**

PROGRAM-GUIDE-DISPLAY CONTROLLING APPARATUS AND
TELEVISION RECEIVER

[Number of claims] 3

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[Title of the Invention] PROGRAM-GUIDE-DISPLAY CONTROLLING APPARATUS AND TELEVISION RECEIVER

[CLAIMS]

[Claim 1]

A program-guide-display controlling apparatus for displaying a plurality of program guides on a display unit in a matrix form by using one of the ordinate and the abscissa as a channel number axis and another one as a time axis,

wherein a mark is displayed at a position corresponding to the present time in a display area on said display unit.

[Claim 2]

A program-guide-display controlling apparatus for displaying a plurality of program guides on a display unit in a matrix form by using one of the ordinate and the abscissa as a channel number axis and another one as a time axis, comprising:

means for displaying a mark at a position corresponding to the present time in an display area on said display unit; and

means for moving said mark to a position corresponding to the present time periodically or nonperiodically.

[Claim 3]

A television receiver comprising the program-guide-display controlling apparatus as claimed in claim 1 or 2.

[Detailed Description of the Invention]

[0001]

[Technical Filed]

The present invention relates to a program-guide-display controlling apparatus for displaying a program guide necessary for selecting a program desired by a user from a plurality of channels in a television broadcasting, and a television receiver.

[0002]

[Background of the Invention]

In the digital satellite broadcasting system (DSS) which has been put to commercial use in the United States, a multiplicity of more than 150 channels are available, and very numerous programs are being provided. In this system, guide information on programs which are presently being broadcast and programs which will be broadcast in the future is transmitted at predetermined time intervals together with primary program data. A user-side terminal has a function of displaying a program guide screen (program guide table) on the basis of the program guide information.

[0003]

As shown in Fig. 8, a partial program guide table of an entire program guide table E corresponding to the entire program guide information received is displayed as a program guide screen on the user-side terminal. A plurality of program

guides are displayed on the program guide screen in a matrix form by using the ordinate as a channel number axis and the abscissa as a time axis. In this example, programs on five channels for a period of two hours and a half are displayed on the program guide screen. At the left end, channel numbers are displayed in a vertical arrangement. Frames which indicate the time zones of programs which are broadcast on the respective channels are displayed in rows corresponding to the respective channels, and titles (A to P) are displayed in the respective frames.

[0004]

On the program guide screen, a cursor for designating a program or scrolling the program guide screen appears. The movement of this cursor is effected by operating any of the four cursor movement keys provided for the left, right, upward and downward directions. Each time a cursor movement key for the upward or downward direction is operated, the cursor is moved in a unit of channel. Also, each time a cursor movement key for the left or right direction is operated, the cursor is moved in a unit of predefined time.

[0005]

Programs which are provided in the DSS include no-charge programs which can be viewed free of charge if the user pays a system utilization fee, including a charge for subscribing to the DSS, a basic fee, and the like, as well as chargeable

programs for which fees are charged separately from the system utilization fee. In addition, the chargeable programs include those which the user purchases in advance in units of channels, and those for which fees are charged only when the programs are viewed (PPV: pay per view).

[0006]

To view a PPV program, a procedure for purchase must be taken on the television screen before the program is started or when that program is being broadcast. To purchase a PPV program, a PPV program to be purchased is selected from a program guide table displayed on the television screen shown in Fig. 8. Then, since a purchase procedure screen is displayed, a purchase procedure is taken in accordance with the instructions on the screen. Then, when the PPV program for which the procedure for purchase has been completed is watched, regardless of the viewing time, a prescribed charge for the PPV program is charged.

[0007]

[Problems that the Invention is to Solve]

By the way, there are cases where the user happens to select and view a PPV program after the elapse of a certain time from the starting of the broadcast of the PPV program, without recognition of the user. In such a case, since a fixed fee for the PPV program is charged irrespective of the viewing time, a situation should be avoided to occur in which a PPV

program is selected and viewed without recognizing the elapsed time after the starting of the broadcast of the PPV program.

[0008]

It is an object of this invention to provide a program guide display controlling apparatus and a television receiver which can avoid a situation in which a PPV program is selected and viewed without recognizing the elapsed time after the starting of the broadcast of the PPV program.

[0009]

[Means for Solving the Problems]

In accordance with a first aspect of this invention, there is provided a program-guide-display controlling apparatus for displaying a plurality of program guides on a display unit in a matrix form by using one of the ordinate and the abscissa as a channel number axis and another one as a time axis, wherein a mark is displayed at a position corresponding to the present time in an display area on said display unit.

[0010]

In accordance with a second aspect of this invention, there is provided a program-guide-display controlling apparatus for displaying a plurality of program guides on a display unit in a matrix form by using one of the ordinate and the abscissa as a channel number axis and another one as a time axis, comprising means for displaying a mark at a position corresponding to the present time in an display area on said

display unit, and means for moving the mark to a position corresponding to the present time periodically or nonperiodically.

[0011]

In the program guide display controlling apparatus according to the first and second aspects of this invention, since a mark is displayed at a position corresponding to the present time in the display area on the display unit, the user can recognize the elapsed time after the starting of the broadcast of a program being presently broadcast at a glance. Therefore, it is unlikely to happen to select, and view a PPV program without recognizing the elapsed time after the starting of the broadcast of the PPV program.

[0012]

A television receiver according to this invention comprises a first program guide display controlling apparatus or a second program guide display controlling apparatus as described above.

[0013]

[Mode for Carrying Out the Invention]

Referring now to the drawings, a description will be given of an embodiment in a case where the present invention is applied to the digital satellite broadcasting system (DSS) which has been put to commercial use in the United States.

[0014]

[1] Configuration of user-side terminal

[0015]

Fig. 1 shows a configuration of a user-side terminal.

[0016]

A combination of a television receiver and a program-guide-display controlling apparatus, or a television receiver incorporating a program-guide-display controlling circuit is used as the user-side terminal. The user-side terminal has a CPU 6 for controlling the overall user-side terminal. The CPU 6 has a storage device 9 for storing its program and necessary data. An operation unit 5 comprising a remote controller or the like is connected to the CPU 6. The CPU 6 controls a tuner 2 for displaying a program selected by the operation unit 5, and controls a program-guide-image generating circuit 4 for generating a program guide image.

[0017]

A high-frequency signal from an unillustrated parabolic antenna is inputted to an input terminal 1. The signal inputted to the input terminal 1 is sent to the tuner 2. In the tuner, processing such as frequency conversion, QPSK demodulation and the like is effected, and a stream of digital video signals is generated. An output from the tuner 2 is sent to a video processing circuit 3.

[0018]

In the video processing circuit 3, the stream outputted

from the tuner 2 is MPEG decoded, and an analog video signal for displaying on a display unit 8 such as a CRT, e.g., an NTSC signal, is generated. This video signal is sent to the display unit 8 through a multiplexer 7 so as to be displayed on the display unit 8.

[0019]

Further, in the video processing circuit 3, program guide information and time information representing the present time is extracted from the output from the tuner 2, and is supplied to the CPU 6. The program guide information and time information supplied to the CPU 6 are stored in the storage device 9. Set screen information for displaying various set screens such as a menu screen is stored in advance in the storage device 9, and information concerning programs which have been purchased and the like are also stored therein.

[0020]

The program-guide-image generating circuit 4 has a display memory (not shown). In the program-guide-image generating circuit 4, various set images and program guide images are formed on the display memory on the basis of the set screen information, the program guide information, and the like which are stored in the storage device 9. Then, the images formed on the display memory are consecutively read, and are sent to the display unit 8 through the multiplexer 7 so as to be displayed on the display unit 8. On the basis of a control

signal from the CPU 6, the multiplexer 7 selects one of the output from the video processing circuit 3 and the output from the program guide image generating circuit 4, and supplies it to the display unit 8.

[0021]

The operation unit 5 is provided with a menu key 11 for displaying the menu screen, four cursor movement keys 12L, 12R, 12U, and 12D for moving a cursor horizontally and vertically, a select key 13 for selecting and inputting, and the like. When the user wishes to view a program guide screen, it suffices that the user operates the menu key 11 to display the menu screen, and then selects a program guide by operating the cursor movement keys 12L, 12R, 12U, and 12D and the select key 13.

[0022]

In order to purchase a PPV program, the PPV program is selected from the program guide screen. Then, a purchase procedure screen will appear. It is necessary that the user follows the instructions of the screen to perform a purchase procedure.

[0023]

[2] Process for displaying the program guide screen

[0024]

A process for displaying the program guide screen will be described below. The transmission side transmits the program guide information periodically. The program guide information

includes guide information on the programs for all the channels from the present time to the time 24 hours ahead, for example. The program guide information on one program includes a title, its fee (rate) if the program is a PPV program, the category (sports, music, dramas, news, etc.), the starting time, the ending time, and so on.

[0025]

The CPU 6 regards the guide information on the programs for all the channels as being two-dimensionally arranged information in which the channel numbers are set in the vertical direction and the time is set in the horizontal direction as shown on the upper side in Fig. 8, and the CPU 6 generates an index table which can be accessed by using the channel numbers and slot numbers indicating the time. The slot numbers are numbers which are allotted in units of 30 minutes, for example. Incidentally, the two-dimensionally arranged region E corresponding to the entire program guide information shown on the upper side in Fig. 8 will be referred to as an entire program guide region.

[0026]

If a program guide display is selected by the operation unit 5, the CPU 6 generates a display table such as the one shown in Fig. 2 on the basis of the channel number selected immediately before then, the present time, and the index table. In Fig. 2, the program guide display information is stored in

small regions (hereafter referred to as cells) in the region excluding the leftmost column. Accordingly, in this example, a display table corresponding to a 5 channels X 5cells portion (corresponding to two hours and a half) of the program guide is generated. The channel numbers (absolute channel numbers) or data on the station names corresponding to those channel numbers are stored in the cells in the leftmost column.

[0027]

In Fig. 2, x in (x, y) described as an index in each cell denotes a relative channel number (a relative channel number among the cells in the display table, and not an absolute channel number), and y denotes a relative slot number (a relative slot number among the slots in the display table, and not an absolute slot number). The program guide display information corresponding to the channel number selected immediately before then and the present time is stored in a second slot So from the left in an uppermost row (hereafter this cell will be referred to as a reference cell).

[0028]

The program guide display information stored in each cell includes a title, the number of exclusively occupied cells, the rating, information representing whether or not the program has been purchased, the category, and so on. The number of exclusively occupied cells is the number of cells included from the current cell to the last cell of the program. Therefore, the

number of cells is one if the current cell is the last one of the program. On the basis of the display table thus created, the program-guide-image generating circuit 4 generates on the display memory an image corresponding to the program guide screen such as the one shown on the lower side in Fig. 8. Then, as the image generated on the display memory is sent to the display unit 8, the program guide screen such as the one shown on the lower side in Fig. 8 is displayed on the display unit 8.

[0029]

The program guide information sent periodically to the user-side terminal has the time information representing the present time and the information as to whether or not the program information has been changed (program guide information changing information) appended. As described above, in the case where the minimum unit of slot is 30 minutes, the program guide information is changed at least every 30 minutes.

[0030]

The CPU 6 effects interrupt processing each time the program guide information is sent thereto. In this interrupt processing, on the basis of the program-guide-information changing information included in the program guide information, a determination is made as to whether or not the program guide information has been changed. If it is determined that the

program guide information has been changed, a program-guide-information change flag FA for storing that the program guide information has been changed is set ($FA=1$). In addition, the program guide information stored in the storage device 9 is updated, and the index table is also updated.

[0031]

Further, in the interrupt processing, a determination is made as to whether or not the time information received previously and the time information received this time are different. If it is determined that the time information received previously and the time information received this time are different, a time-information change flag FB for storing that the time information has been changed is set ($FB=1$). In addition, the time information stored in the storage device 9 is updated.

[0032]

Figs. 3 and 4 show an overall procedure of processing which is executed by the CPU 6 and the program-guide-image generating circuit 4 in the case where the program guide is selected by the operation unit 5.

[0033]

When the program guide is selected by the operation unit 5, the channel number selected immediately before then and the present time are read, and the reference cell is set from the entire program guide region E. See Fig. 8. (Step 1).

[0034]

The display table shown in Fig. 2 is created on the basis of the set reference cell and the index table (Step 2).

[0035]

Information in this display table is sent from the CPU 6 to the program-guide-image generating circuit 4. In the program-guide-image generating circuit 4, program-guide-image generation processing is effected on the basis of the sent information (Step 3). That is, a program guide image is generated on the display memory. As the program guide image generated on the display memory is consecutively read and sent to the display unit 8, a program guide screen is displayed on the display unit 8. A process for generating a program guide image will be described later in detail.

[0036]

In addition, time-related-image generation processing is effected (Step 4). Namely, the present time is digitally displayed at an upper left portion of the display screen, and a triangular mark ▲ is displayed in a lower region of the display screen at the position corresponding to the present time, as shown in Fig. 7. A description will be given later of the details of the time-related-image generation processing.

[0037]

Next, a determination is made as to whether or not the

program-guide-information change flag FA has been set (Step 5). If the program-guide-information change flag FA has not been set, a determination is made as to whether or not time-information change flag FB has been set (Step 6). If the time-information change flag FB has not been set, a determination is made as to whether or not there has been a select key input by the select key 13 (Step 8). If there has been no select key input by the select key 13, a determination is made as to whether or not there has been a cursor key input by the cursor movement keys 12L, 12R, 12U, and 12D (Step 9). If there has been no cursor key input by the cursor movement keys 12L, 12R, 12U, and 12D, the operation returns to Step 5. Then, processing in Steps 5, 6, 8, and 9 is repeated until a key input is made.

[0038]

When there has been a select key input by the select key 13 (YES in Step 8), predetermined selection processing such as the selection of a program, a reservation of a program, and the like is executed.

[0039]

When there has been a cursor key input by the cursor movement keys 12L, 12R, 12U, and 12D (YES in Step 9), processing at Step 10, 11, 12, 13 is effected in correspondence with the operated cursor movement keys 12L, 12R, 12U, and 12D.

[0040]

In other words, if the operated key is the left movement key 12L, the operation proceeds to Step 10 to determine whether or not there has been a command for leftward movement from the left end of the entire program guide region E. If the operated key is the right movement key 12R, the operation proceeds to Step 11 to determine whether or not there has been a command for rightward movement from the right end of the entire program guide region E. If the operated key is the upward movement key 12U, the operation proceeds to Step 12 to determine whether or not there has been a command for upward movement from the upper end of the entire program guide region E. If the operated key is the downward movement key 12D, the operation proceeds to Step 13 to determine whether or not there has been a command for downward movement from the lower end of the entire program guide region E.

[0041]

The cursor cannot be moved if there has been a command for leftward movement from the left end of the entire program guide region E (YES in Step 10), if there has been a command for rightward movement from the right end of the entire program guide region E (YES in Step 11), if there has been a command for upward movement from the upper end of the entire program guide region E (YES in Step 12), or if there has been a command for downward movement from the lower end of the entire program guide region E (YES in Step 13), that is, if the command is

for movement to the outside direction of the entire program guide region. Hence, the operation returns to Step 5, and is set in a state of waiting for a key input.

[0042]

If the cursor movement command by the cursor key input is a movement command within the overall program guide area, the position of the destination of the cursor movement is calculated (Step 14). If the cursor movement command is a left or right movement command, the position of the destination of the cursor movement is calculated by supposing the amount of movement to be equal to one cell (slot) in the left or right direction. Then, a determination is made as to whether or not the position of the destination of the cursor movement is within the program guide screen being displayed on the display unit 8 (Step 15).

[0043]

If the position of the destination of the cursor movement is within the program guide screen being displayed on the display unit 8, the cursor image within the display memory is moved so that the cursor is displayed at the position of the destination of movement (Step 16). Then, the operation returns to step 5.

[0044]

If the position of the destination of the cursor movement is outside the program guide screen being displayed on the

display unit 8, the slot corresponding to the position of the destination of cursor movement is set as the reference cell to change (scroll) the program guide screen (Step 17). Then, the operation returns to Step 2. Accordingly, the display table shown in Fig. 2 is created on the basis of the newly set reference slot, and a new program guide screen is displayed on the display unit 8. Namely, the program guide screen is updated.

[0045]

In a case where the program guide screen is being displayed, if the operation is set in a state of waiting for a key input by the operator, processing in Steps 5, 6, 8, and 9 has been repeated. Therefore, if the program-guide-information change flag FA is set ($FA = 1$) by interrupt processing by the CPU 6 while the program guide screen is being displayed, YES is given as the answer in Step 5, and the operation proceeds to Step 7. When the operation has proceeded from Step 5 to Step 7, the time information representing the present time should have also been updated. In Step 7, the reference cell is updated on the basis of the present time represented by the updated time information and the channel number selected immediately before then.

[0046]

Specifically, the reference cell is moved by a one-cell portion in the direction in which the time proceeds (in the rightward direction). Then, the operation returns to Step 2

to effect the processing for creating the display table and the program-guide-image generation processing. That is, if the program-guide-information change flag FA is set ($FA = 1$) by interrupt processing while the program guide screen is being displayed, the program guide image is updated. Incidentally, the program-guide-information change flag FA is reset in the program-guide-image generation processing, as will be described later.

[0047]

Meanwhile, if the time-information change flag FB is set ($FB = 1$) by interrupt processing by the CPU 6 while the program guide screen is being displayed, YES is given as the answer in Step 6, and the operation returns to Step 4 to effect the time-related-image generation processing. That is, if the time-information change flag FB is set ($FB = 1$) by interrupt processing while the program guide screen is being displayed, the time-related image is updated. It should be noted that the time-information change flag FB is reset in the time-related-image generation processing, as will be described later.

[0048]

[3] Program guide image generation process

[0049]

Fig. 5 shows steps in detail for processing the program guide image generation of the step 3 as shown in Fig. 3.

[0050]

First, the program-guide-information change flag FA is reset ($FA = 0$) (Step 21). Cases where the program-guide-information change flag FA is changed from the set state to the reset state include a case where the program-guide-information change flag FA has already been set when the display of the program guide screen is selected, and the operation has proceeded to Step 3 through Steps 1 and 2; and a case where the program-guide-information change flag FA is set while the program guide screen is being displayed, and the operation has proceeded to Step 3 through Steps 5, 7, and 2.

[0051]

Next, a frame image of a size corresponding to the occupying time of each program is written in the display memory for each program within the display table on the basis of the number of the exclusively occupied cells (Step 22). Next, a cursor image is written in the display memory (Step 23). Subsequently, an image representing a title (title image) is written in each frame (Step 24). This completes the program-guide-image generation processing for the present occasion.

[0052]

[4] Time related image generating process

[0053]

Fig. 6 shows a detailed procedure of the time-

related-image generating processing in Step 4 shown in Fig. 3.

[0054]

First, the time-information change flag FB is reset (FB = 0) (Step 31). Cases where the time-information change flag FB is changed from the set state to the reset state include: a case where the time-information change flag FB has already been set when the display of the program guide screen is selected, and the operation has proceeded to Step 4 through Steps 1, 2, and 3, and a case where the time-information change flag FB is set while the program guide screen is being displayed, and the operation has proceeded to Step 4 through Step 6.

[0055]

Next, numerical values and a code are written in the display memory for digitally displaying the present time at an upper left portion of the display screen (Step 32). Incidentally, the present time is specified by the time information sent from a transmitting side. Then, a determination is made as to whether or not the present time is included in a broadcast time zone corresponding to the program guides stored in the display memory (Step 33).

[0056]

If it is determined that the present time is included in the broadcast time zone corresponding to the program guides stored in the display memory, the position which is in the lower

region of the display screen and corresponds to the present time is calculated (Step 34), and the triangular mark Δ is written at the position in the display memory which correspond to the calculated position (Step 35). This completes the program-guide-image generation processing for the present occasion. As a result, the program guide screen such as the one shown in Fig. 7 is displayed on the display unit 8.

[0057]

If it is determined in the aforementioned Step 33 that the present time is not included in the broadcast time zone corresponding to the program guides stored in the display memory, the program-guide-image generation processing for the present occasion ends without effecting processing in Steps 34 and 35.

[0058]

In the above-described embodiment, since the triangular mark Δ is displayed at the position which is in the lower region of the display screen and corresponds to the present time as shown in Fig. 7, it is possible to recognize at a glance the elapsed time after the starting of the broadcast of the program being presently broadcast. For this reason, a situation is difficult to occur in which a PPV program is selected and viewed without recognizing the elapsed time after the starting of the broadcast of the PPV program.

[0059]

[Effect of the Invention]

According to this invention, a situation can be avoided to occur in which a PPV program is selected and viewed without recognizing the elapsed time after the starting of the broadcast of the PPV program.

[BRIEF DESCRIPTION OF THE DRAWINGS]

Fig. 1 is a block diagram showing a configuration of a user-side terminal.

Fig. 2 is a schematic view showing a display table.

Fig. 3 is a flowchart illustrating a part of the processing procedure for displaying the program guide screen.

Fig. 4 is a flowchart illustrating another part of the processing procedure for displaying the program guide screen.

Fig. 5 is a flowchart illustrating steps in detail for processing the program guide image generation of Step 3 shown in Fig. 3.

Fig. 6 is a flowchart illustrating a detailed procedure of time-related-image generation processing in Step 4 shown in Fig. 3.

Fig. 7 is a diagram illustrating an example of the program guide screen.

Fig. 8 is a schematic view showing the program guide screen displayed on the user-side terminal in DSS.

[Name of Document]

ABSTRACT

[Abstract]

[Object]

It is an object of this invention to provide a program guide display controlling apparatus and a television receiver which can avoid a situation in which a PPV program is selected and viewed without recognizing the elapsed time after the starting of the broadcast of the PPV program.

[Means to Achieve the Object]

A program-guide-display controlling apparatus for displaying a plurality of program guides on a display unit in a matrix form by using one of the ordinate and the abscissa as a channel number axis and another one as a time axis in which a mark is displayed at a position corresponding to the present time in a display area on the display unit.

[Selected Drawing]

Fig. 1



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FIG. 1

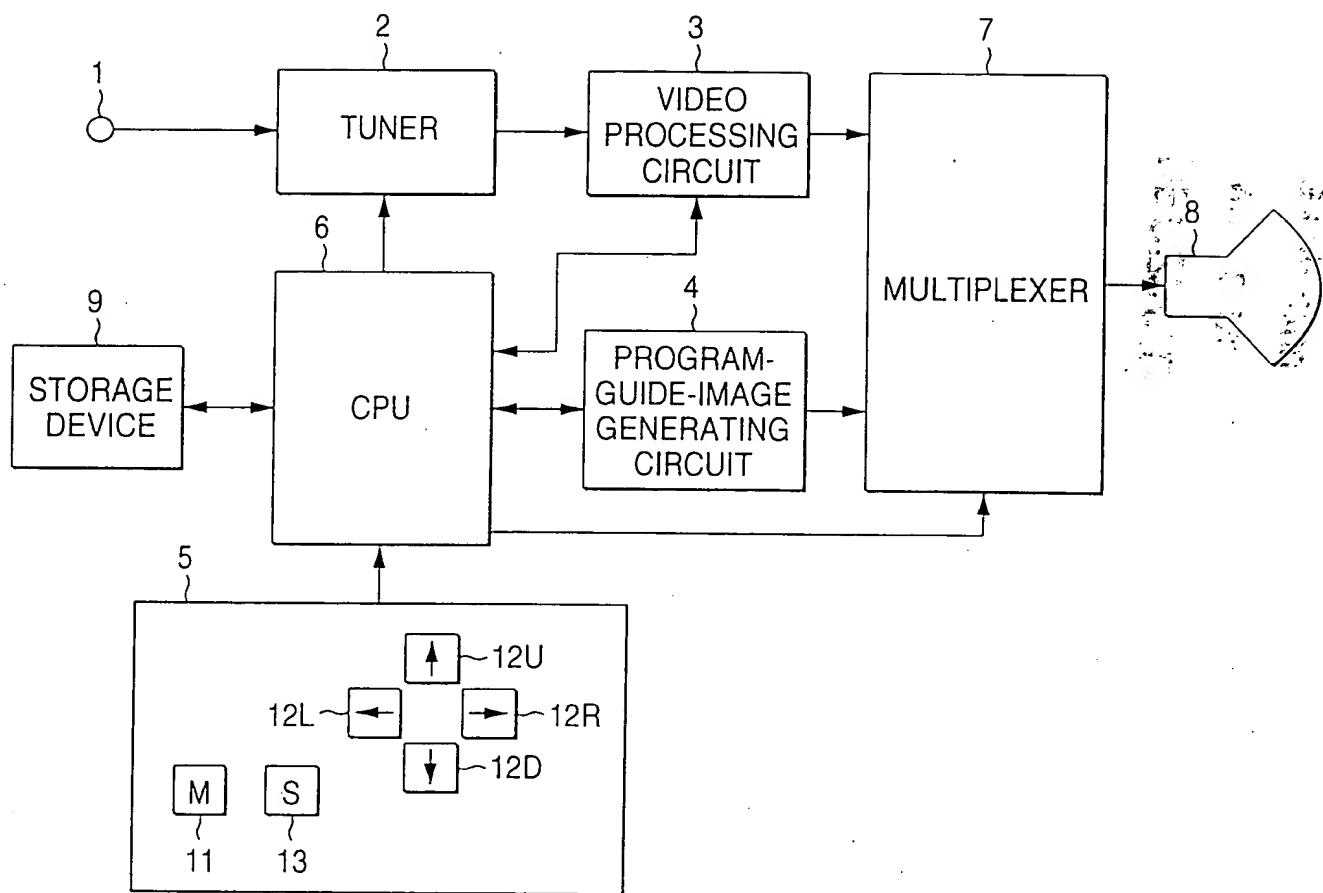


FIG. 2

So					
(1, 0)	(1, 1)	(1, 2)	(1, 3)	(1, 4)	(1, 5)
(2, 0)	(2, 1)	(2, 2)	(2, 3)	(2, 4)	(2, 5)
(3, 0)	(3, 1)	(3, 2)	(3, 3)	(3, 4)	(3, 5)
(4, 0)	(4, 1)	(4, 2)	(4, 3)	(4, 4)	(4, 5)
(5, 0)	(5, 1)	(5, 2)	(5, 3)	(5, 4)	(5, 5)

FIG. 3

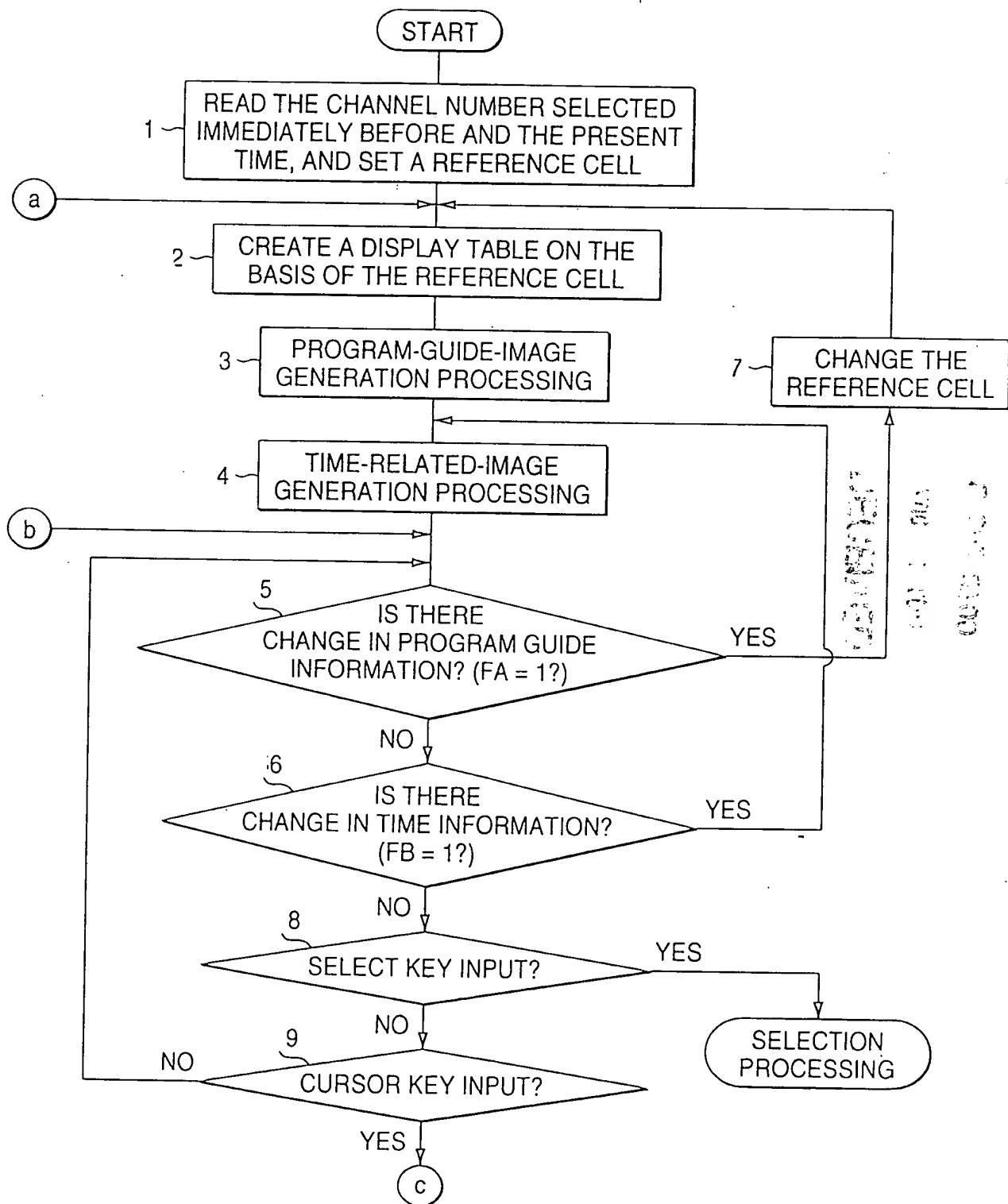


FIG. 4

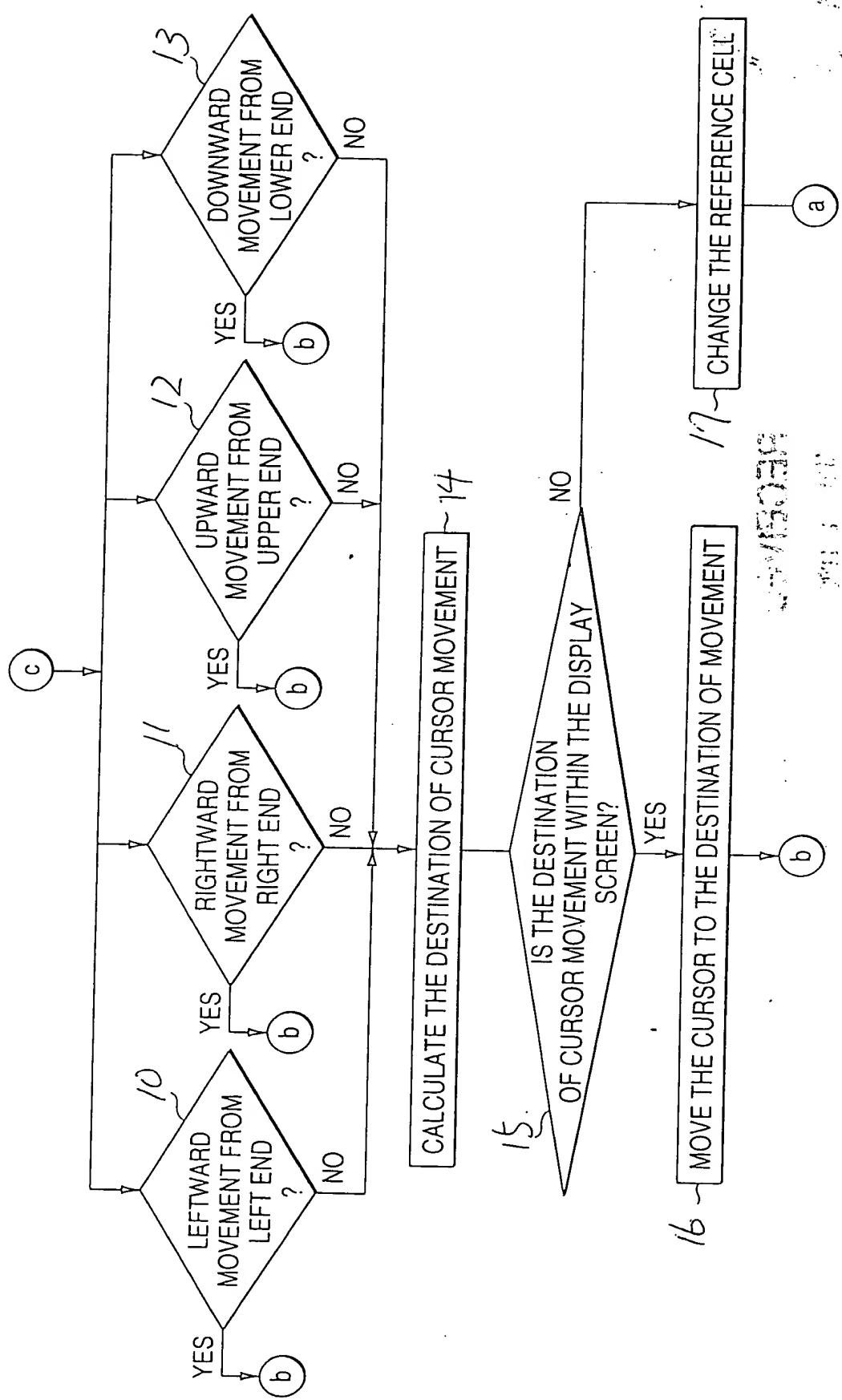


FIG. 5

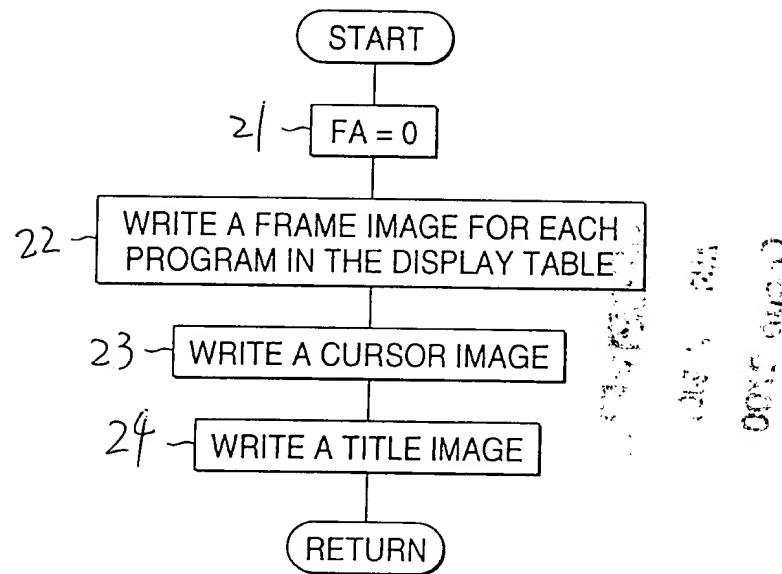


FIG. 6

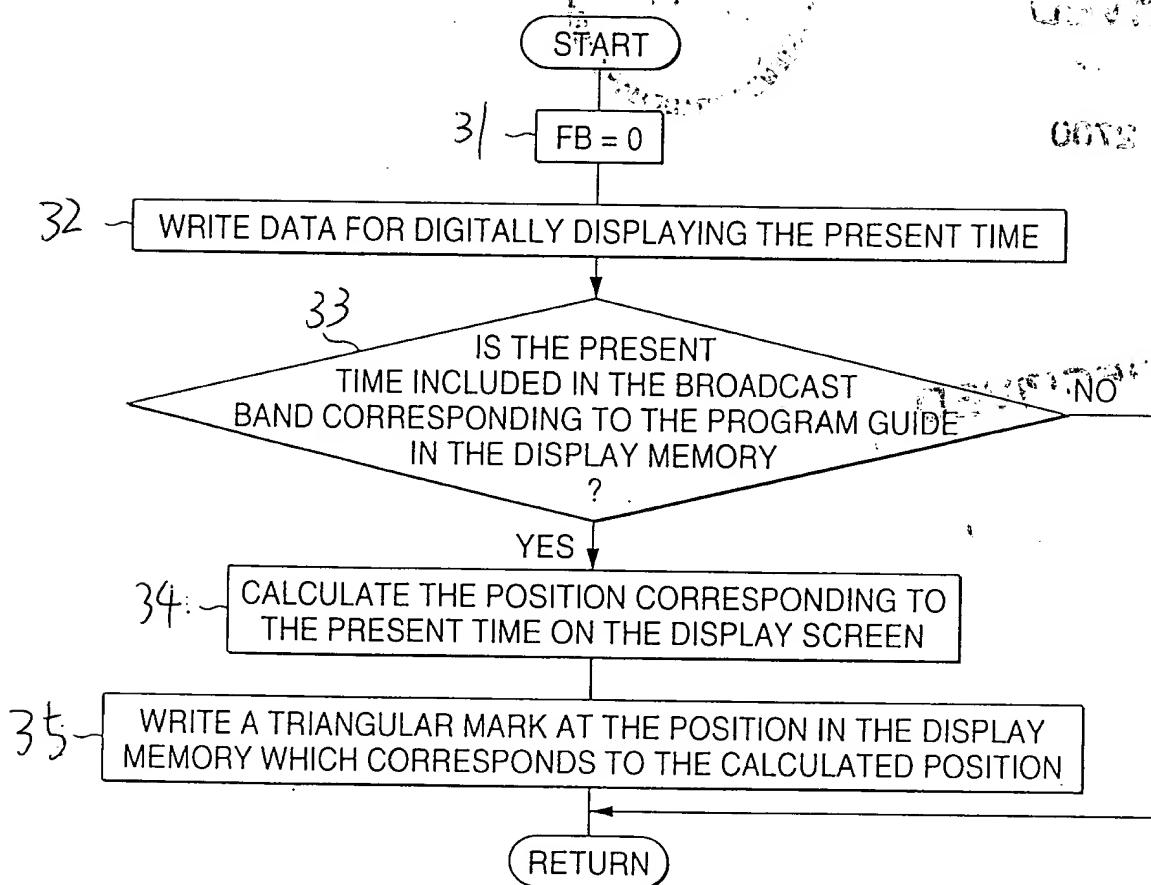


FIG. 7

	9:10	9:00	9:30	10:00	10:30	11:00
CH. 2		A		B		
CH. 4	C	D	E	F	G	
CH. 6	H		I		J	
CH. 8	K	L		M		
CH. 10	N	O		P		

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FIG. 8

